

Q&A With Surprise Winner In Engineer Academy Vote

Harold Liebowitz, President-elect of the National Academy of Engineering, is a rarity in the power circles of Washington science and technology. He bucked the establishment and won, running, at age 70, as a "petition candidate"—put on the ballot by fellow members—over the unopposed opposition of the NAE's ruling core, which went all out for the sole choice of the Nominating Committee, Cornelius Pings, President of the Association of American Universities [SGR, April 15]. In 1991, in his first petition run, Liebowitz, former Dean of Engineering at George Washington University, received 42 percent of the vote, campaigning, then as now, against what he deplored as management by clique at the NAE. This time he won, 697-660, in a mail ballot for which results were announced April 11, leaving the NAE's old boys appalled at the outcome. The Academy, the honorary peak of the engineering profession, as well as an adviser to government, is a pillar of the science establishment, and customarily manages its internal affairs with flawless aplomb. Liebowitz spoke with SGR Editor Greenberg on April 20. Following is the text, transcribed and edited by SGR.

Q. What are your plans for the Academy?

Liebowitz. I take office July 1. I plan for the first three months to stop, look, and listen. I have to see what the Academy specifically is doing. But I have ideas on what has to be done. I will carry out my platform.

Q. Tell me what your platform is.

Liebowitz. A major item is to get the membership involved very heavily, and for them to identify, for us to identify, what national issues there are. And to define them, to do something about it. And I've already started to do something about it.

Q. Do you think the members feel they've been left out?

Liebowitz. The membership, I would say, feels that it hasn't been involved in decision making. And I'd rather not criticize the past administration, but I feel that many issues appear not to have been covered.

Q. Give some examples.

Liebowitz. Examples are what will the government laboratories' role be? What about engineering education? Where are we with the universities? What do we do with accreditation in that vein also? Do we allow more flexibility in programs? There's a problem of international students. I don't say a problem. The problem concerns international students.

Q. What problem is that?

Liebowitz. The number of PhDs who are graduating. At least half or more are of international parentage. And the

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Funding Cuts Stir Pleas and A Look at Political Action

How is the scientific leadership responding to the mayhem implicit in Republican budget-cutting vows and in Clinton's competing designs for frugality? Answer: Mainly with customary pleas for care and understanding, plus a glimmer of interest in direct, political counter punching.

But so far, science has fielded a mild, undemonstrative response, a mere peep in comparison to the big-league lobbying campaigns mounted in other sectors threatened by Washington's budget-cutting derby. For science, no placard-bearing parades across the Capitol plaza, in the fashion of school-lunch defenders; no full-page newspaper ads; no threats of electoral retribution or promises of support.

But it must be noted that, with doomsday for science and technology funding shimmering on the horizon, dour proph-

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In Brief

The "social construction of science," chic dogma in the social sciences, drew scorn last week from molecular biologist Bruce Alberts, President of the National Academy of Sciences. In developing science-education standards, he told the NAS annual meeting, "we encountered an alliance of educators who insist that there is no such thing as objective reality." Alberts cited "our present detailed understanding of how human muscles work"—which, he said, "is presumably viewed as only one of the many answers we might have arrived at had science progressed in a different way. This is absurd," he declared, adding, "Do most Americans leave college as confused about science as some of their professors?"

Is a US Department of Science in the making? The Administration is against it, says White House Science and Technology Advisor John Gibbons. The leading proponent, Chairman Robert Walker of the House Science Committee, has stepped back a bit, saying it depends on whether cabinet departments are abolished and a new homebase is needed for surviving science and technology agencies.

A little slower than expected, the State-Federal Science and Technology Partnership Task Force has come into existence, co-chaired by two former governors, Richard Celeste, Ohio, and Dick Thornburgh, Pennsylvania. Last January 26, when S&T Advisor Gibbons announced creation of the Task Force, he set a 90-day deadline for a report delineating the new era of R&D collaboration between Washington and the states. The membership list, 20 in all, was announced on April 25, when the Task Force held its first meeting, at which a 90-day deadline was set for the report.

... Science Society Heads to Discuss Science PAC

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ecies have steadily risen to the point where more drastic measures might possibly be the next step. The transition from whining to political action—fund raising, candidate support, etc.—is a well-established pattern among threatened beneficiaries of the US Treasury.

Scientists, however, have traditionally been skittish about linking their profession to partisan politics or even individual candidates, regardless of party. Nonetheless, the intensity of the outcries suggests that the mandarins are stirring from their long and comfortable relations with Washington, and possibly glimpse that they've gone as far as they can go on good will and the mystique of science.

There's some talk about taking the political route. Several months ago, former Congressman Doug Walgren, an alumnus of the House Science Committee, recommended the establishment of a Political Action Committee to the Council of Scientific Society Presidents, a Washington-based organization of 64 societies, including many of the big ones. The agenda for the Council's May 7 Board meeting includes discussion of the Walgren proposal, which basically calls for raising money to assist science-friendly candidates.

In recent weeks, in a variety of forums, the chieftains of science have been pounding out warnings against penny-wise, pound-foolish economizing on research and associated activities. True enough, the protesters have mainly been talking to themselves at in-group meetings that draw remarkably little mainstream press notice, despite efforts to spread the word. But the expectation is that the clamor will eventually penetrate to political regions where it will do some good.

At last week's annual meeting of the National Academy of Sciences, NAS President Bruce Alberts said society under-values and underinvests in science. For research support to be "preserved and expanded," he said, scientists "must be much more aggressive in addressing the fundamental issues of communicating what we do and why we do it."

To assist in this, Alberts announced, the Academy is producing a set of case studies that would "take a recent development that everyone cares about—such as genetic testing and diagnosis—and trace its origins, explaining how the benefit today has depended on previous fundamental scientific investigations of an unpredictable and untargeted nature." The project is under the supervision of NAS Vice President Jack Halpern, of the University of Chicago. Next step, Alberts said, is to publicize the studies.

Heated words about R&D budget issues were delivered April 18 by John Gibbons, the President's Science and Technology Advisor, at the annual R&D budget meeting of the American Association for the Advancement of Science. The course navigated by Gibbons on this topic is sinuous in nature, as the Administration for which he labors overtime will never be mistaken for Santa Claus by the fretful inhabitants of the scientific community. Clinton's depredations against R&D spending are only slightly less brutal than the

Republicans'—as NASA chief Daniel Goldin, among others, can testify. Furthermore, Republicans have grabbed the theme of prioritizing federal R&D programs in favor of basic research—a pleasing prospect for the university crowd, which dominates public discussions of science policy.

The Republicans say they would prioritize at the expense of the Administration's industrial technology programs, which, while of no interest to academe, are yet to muster support from ingrate beneficiaries in the business world.

So Gibbons adroitly cautioned that economizing in R&D "must not be done with a meat ax when the precision of a scalpel is necessary."

"Yet," he continued, "the specter of finishing the first session of the 104th Congress with S&T resources slashed by a meat ax is a real one. In their rush to cut government ... some Members have launched a wholesale attack on anything that isn't nailed to the table—including R&D, and especially the "D" in R&D. But don't be lulled into thinking that basic research is sacrosanct," Gibbons said, adding that "The cuts we've already seen are nothing compared to what [the Republicans] are thinking about."

The prospect of deep cuts has set loose a barrage of worried statements and pleas for caution. In February, the National Science Board, NSF's policy body, urged the budget cutters to be sensitive to the inter-connectedness of R&D programs. In March, the CEOs of 15 major high-tech corporations sent House Speaker Newt Gingrich a letter urging "continued support of a robust federally supported university research program." On April 18, Commerce Secretary Ron Brown told a press briefing the Administration would fight Republican plans to eliminate his Department's Advanced Technology Program.

Even Bill Clinton has joined the fray, sending a message to Congress on March 31 reiterating his support for science and technology and, of course, deficit reduction.

Up till now, science and technology have prospered without getting into grubby politics. But maybe it's time for the scientific community to consider why legislators fear the National Rifle Association and other muscular lobbies. Clue: It's not for the social worthiness or deep logic of their positions.—DSG

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... Aims for Bigger NAE Role in White House Advice

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question is, are they going to be staying here, helping us in our efforts for the United States to maintain its position. There's a whole competitiveness issue, as a national issue. There are issues of aircraft engines.

Q. Are you saying foreign students who get their PhDs here should stay here?

Liebowitz. No. I think that's something we have to discuss and debate. Is the United States benefiting by that student? And I would say that's only a slight issue. There are more important issues.

Q. Do you want the NAE to study these matters in its usual way, by setting up committees and doing research?

Liebowitz. No, no. Every member should have an opportunity to send in his idea or her idea on what topics should be covered. For example, on mineral and metals, should the Academy do anything? Is there a problem, first of all? Is there a problem that we have for our competitiveness? What about the steel industry? Should we do anything about the steel industry? Should NAE do anything about it?

Q. What can the NAE do about the steel industry or minerals?

Liebowitz. They could point out to the White House, they could point out to Congressmen, where we stand, what is needed. Are we being competitive with Japan, where the companies are being supported by the government? To what extent are we competitive? What's going to happen to the aircraft industry? We have a \$30 billion offset [export surplus]. Are we going to lose that?

Q. You will ask the NAE members to indicate what they think are the important problems of national policy in engineering, to name subjects, and then you will solicit their views on how these might be addressed by the government?

Liebowitz. I'm asking a number of people I know, who are in the Academy, to write position papers. I've talked to them on an informal basis. Then I hope for that to be presented to [NAE] Council, to make sure they're involved, and other people, as well. There will be presentations made.

Q. Presentations of what to whom?

Liebowitz. Presentations of these position papers to a strategic planning committee.

Q. That would be something new at the Academy.

Liebowitz. I think the Council has something similar to that. And I would have to see if there's an overlap and how they could participate in this, as well. And then, after the presentations are made, to send it out to the membership and get their ideas. For example, there's a question that one of the members has had about having a science court. Now, I'm a little concerned about it being a science court, because it means a decision is going to be made on what procedures, what line of attack should be made in a particular technical area. I wouldn't go so far as to make that decision. What I'd like to see is a platform offered where this could be discussed and debated. And then present that to the White House and

people who decide whether the money should be spent.

Q. The purpose, in regard to the science court, would be to bring this formulation to the attention of the White House as something that it could explore?

Liebowitz. Exactly. There's also the question of fundamental research. The Republicans are going to try to balance the budget. And there's a question as to what it's doing to the fundamental research program, and it's being affected, and what will be the consequences of such an event. I think NAE has to be made aware of these problems, and discuss them with its membership. After all, the charter for the National Academy of Sciences was established in 1863, and we come under that charter, to advise the nation on national policies. We have to define those national issues.

Q. With over 1700 members, you'll get back a lot of responses. What will you do with them?

Liebowitz. People are not experts in all areas. We'll divide it up into approximately 12 areas. This is not the usual operation. For example [Lee] Iacocca [of Chrysler auto renown] is a member of our Academy. We can get similar people like Iacocca together and discuss the automotive industry and whether the United States should be where it is, and where it's going. I think that's of interest to White House people. It's not a regular report. We've had similar things, like having a panel. This is getting information out quickly.

Q. A panel system now exists through the National Research Council [NRC, the research arm of the Academies of Sciences and Engineering and the Institute of Medicine]. Would that remain unchanged?

Liebowitz. I have to examine it. We're going to have presentations. I am [as NAE President] the Vice Chairman of the NRC. In that capacity, I will be looking at the programs.

Q. The process you were describing before, of soliciting suggestions and views from the members, of addressing the White House, would this go beyond the traditional panel and report system of the NRC?

Liebowitz. Yes.

Q. Would it be superimposed on it?

Liebowitz. Yes, it would.

Q. That suggests, then, that you find the existing system is insufficient in some fashion.

Liebowitz. If you want to put it that way, yes, with getting information out. There are many things which come up as problems and crises. If we take too long, the crisis is already over and we're still working on a report. We have to examine the system.

Q. You want a quick-reaction system, to identify issues and—

Liebowitz. In addition to the longer studies which the NRC has been doing.

Q. What other problems are out there that might engage the NAE?

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... Worries that NAE Reports Linger on the Shelves

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Liebowitz. There's also a very severe problem, in my estimation, which exists in the transfer of technology from the federal government to the states.

Q. *The Clinton Administration says it's working on that very subject. They had a big meeting here a few months ago to promote federal-state partnerships [SGR, Feb. 1: "Federal-State R&D Ties Hailed as the Coming Wave"]. This is scarcely an issue they're not aware of.*

Liebowitz. I was speaking to one of the members of the Academy. He was indicating to me, and he's a very knowledgeable person, that sometimes the states are not familiar with the efforts of the federal government, and vice versa. And consequently, they're working on the same things without knowing what is being worked on. Also, you have to ask yourself the following: Is the organization, the National Academy of Engineering, structurally, organizationally in a position to carry out national policy which involves national issues and implementation. They've shied away from it.

Q. *Are you saying the NAE will help implement policy?*

Liebowitz. I don't see how we could avoid it easily. I don't know how much we'll be able to do. I realize some of the dangers of that.

Q. *By implementing policy, do you mean putting it into effect?*

Liebowitz. No. I would say by implementing, what I mean is that it is not sufficient to just write a report. Something more has to be done. What that is exactly will be determined in the next few months.

Q. *What are the possibilities?*

Liebowitz. You become an advocate. That has good and bad aspects. Being an advocate means you're not impartial. It has to be discussed with [the NAE] Council, discussed with the membership. But I think something more has to be done. You just don't take a report and put it on the shelf.

Q. *Has that been a serious problem?*

Liebowitz. I don't say a serious problem. It's been by design.

Q. *Do you mean that at present, they issue a report and it's there for anyone who wants to read, and the Academy is done with it?*

Liebowitz. Well, they do more than that. What they do is bring it to attention and they highlight it. But more can be done. Let me take an example—engineering education, something which I'm close to. If we feel there's a severe problem, and nothing is being done about it, what are you supposed to do? Put a report on the shelf and leave it there? You bring it to the attention of people who are decision makers. We're automatically being branded anyway, aren't we? If we're an organization of engineers, people think we're advocates anyway. So, the question is, how far do we go? I don't know yet.

Q. *You mentioned the relationship of the Academy of*

Engineering under the charter of the much older Academy of Sciences. Not long after the NAE was founded in 1964, there was discussion of greater autonomy, even independence. Do you remain under the umbrella of the Academy of Sciences without reservations?

Liebowitz. That's a compound question. I think there are two points—whether to remain under the umbrella; the other one, whether I have any reservations. I'm meeting tonight with the President of the National Academy of Sciences, Bruce Alberts, who invited me, and also Dr. [Kenneth] Shine [President of the Institute of Medicine] is joining us. The three Presidents are getting together to discuss how we can interact, I assume. One goal is get to know each other better. They congratulated me on my election. Another is to see how we can work better. I'm very excited about having that kind of relationship. And I'm happy that Bruce Alberts has taken the initiative.

Q. *Do you entertain any thoughts that the Academy of Engineering should have greater autonomy or perhaps be independent?*

Liebowitz. I think it's better for the nation for all of us to be working together. I don't have any strong reservation at this time. I think the relationship which they have established under the current NAE President—from what I understand today from my briefing [by NAE staff]—is one of the best relationships that they're ever had. So, if that's working, that's fine. But I'm not at a stage yet where I have gone through the program. Like everything else—however good something is, you can still improve on it. And there is some concern that people have about the NRC.

Q. *Concern about what?*

Liebowitz. The output. The quality of the output.

Q. *Do you share those concerns?*

Liebowitz. I would say that I share some of those concerns, but it would be unfair for me to make that statement now until I've gone through the program. I want to see how valid they are.

Q. *The criticisms?*

Liebowitz. Yeah.

Q. *What criticisms are you referring to?*

Liebowitz. Quality.

Q. *The quality of the reports?*

Liebowitz. Yes, of the reports. Many of people who serve on the NRC are not members of either Academy.

Q. *But that's by design, to bring in a wide array of talent.*

Liebowitz. It's also because of the amount of work. The question is, if you don't all have the same priority, can you all turn out the best work on any study that you carry out. We know from a realistic standpoint that's not the case.

Q. *Most of the output, regardless of who is on the committee, is really from the staff. They're here full time, and the people on the committees come and go. What do you think of the staff?*

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... Will Seek Multiple Candidates for All NAE Posts

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Liebowitz. I received two letters of invitation for the NRC staff to brief me on many activities, and I'd like to reserve opinion on that until then.

Q. *You've been involved in Academy affairs since 1975. You know the Academy inside out. You were Home Secretary for two terms.*

Liebowitz. I would say we have intelligent people who are administering the Academy, and I have to believe that, by and large, it's being run very well. Now, we all know that if you have many programs, from \$180 million to \$200 million in programs, that they all can't be of the same quality. You have to sort out which is the best quality. There are questions that come to my mind. One is: should we be in as many studies as we are? Should we turn some down now? I understand that Frank Press, when he was President of the National Academy of Sciences [1981-93], felt any study which is asked of us by the government we have to undertake. I'm not sure that's the case. I want to find out how [Academy of Sciences President] Bruce Alberts and [Institute of Medicine President] Dr. Shine feel about that. I think we also have to get more independent research money, more independent funds so that the Academy can exercise its ingenuity and creativity in carrying out its own studies, for which there isn't always a customer out there who's willing to come and give you the money.

Q. *Hasn't a good deal of money been raised for this purpose?*

Liebowitz. There are about \$30 million now in the NAE. It's a very excellent beginning.

Q. *To go back to the election. Why do you think you won? What were you offering the members that caused them to elect you?*

Liebowitz. I don't want to oversimplify it. I think there was a need for a change of administration. I think some letters [by NAE members] have pointed out that members wanted more participation. I thought that we had to democratize our election process. I don't think any small group, even a medium-size group, should preempt the membership of electing a person of their choice.

Q. *They did elect a member of their choice.*

Liebowitz. They didn't do that four years ago [when Liebowitz first ran as a petition candidate and lost to the incumbent, President Robert White, whom he will now succeed]. It's much more difficult to go a petition route than to be chosen by the Nominating Committee.

Q. *Will you try to change this process?*

Liebowitz. Yes.

Q. *So that anyone can be on the ballot who has some minimal amount of support?*

Liebowitz. I feel that the Nominating Committee should qualify, or should certify, candidates, and leave it to the membership to decide who should be the President. This was not the case. When I said I would democratize elections, I

wasn't only speaking of the office of President. I was speaking of the election of other officers—there should be at least two candidates.

Q. *Do you foresee any need for changing the criteria for election to the NAE [described in the NAE Articles of Organization as "important contributions to engineering theory or practice ... and pioneering of new and developing fields of technology"]?*

Liebowitz. No. I think that the technical achievements of the individual should be very predominant. We have a wonderful opportunity. We are unique in that we have people from industry, very good people, and we have people from government and people from the universities. So now, if we can harness this talent, put it together, I think it offers much more than having only one of these attributes working in a particular area, alone without the others.

Q. *Do you plan to bring in any staff members, or will you work with the existing staff?*

Liebowitz. I will work with the existing staff. I met with them today, to greet them and tell them I will be working with them. I do not plan to bring anyone with me, except—there are already positions provided for individuals, from the membership, who can be fellows and senior fellows. You have to remember also that if you initiate your programs, you're going to need new people. But as of this time, I am not expecting to bring anyone over with me—except maybe one person, two people, three people, from the membership. To get them more involved.

Q. *To come on board fulltime?*

Liebowitz. No. They don't have to be fulltime. It will vary from individual to individual. Some people don't have the time to give.

Q. *In general, you're talking about a more activist role for the Academy.*

Liebowitz. Exactly. No question about it.

Q. *Advising the White House, soliciting ideas from the members, going out to the public and playing an educational role.*

Liebowitz. Let me give you another example. I said there's a tremendous talent existing and opportunities in the NAE because of some of the people we have elected in the Academy. We have the Beckman Center [a meeting facility, in Irvine, Calif.]. What happens if we initiate a program of distinguished Academy fellows who give continuing education courses at the Beckman Center? What happens if these people and their talents are made available to the government? If they're made available to universities? Many people are retired. We do not want to lose that know-how. That know-how is very important. How do we bottle it? How do we contain it and preserve it and utilize it in some way which is of benefit to this country? I think there ought to be a way. These kinds of programs, I call necessary. And I think it would be marvelous, and it's very challenging. We'd be offering something to the retirees. We'd be utilizing them.

PhD Job Shortage? New Study Says No, But

The National Academy of Sciences has released another of its chimerical analyses of the state of science, this one contending that the widely lamented PhD glut is mainly a mirage.

But, to the extent that doctoral joblessness exists, it's so troublesome, the Academy acknowledges, that PhD training should be revamped to prepare graduates for non-research jobs. On the other hand, says the Academy, efforts should also be made to reverse the domestic flight from science and draw more American students into PhD programs.

The findings, in a report titled *Reshaping the Graduate Education of Scientists and Engineers*, were produced by the Committee on Science, Engineering, and Public Policy (COSEPUP), an assemblage of high-ranking academicians which appears to suffer from chronic disengagement from reality.

In 1993, when Congress and the White House were beseeching science to state priorities, COSEPUP responded with a report, *Science, Technology, and the Federal Government*, asserting that Washington should finance "clear leadership" in all important fields of research and at least parity in others [SGR, July 1, 1993: "US Science Can Have It All, Academy Report As-

***Reshaping the Graduate Education of Scientists and Engineers* (\$30, plus \$4 for shipping), order from: National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 1/800-624-6242; in the Washington, DC, area: 202/334-3313.**

serts"]. A year later, the Senate Appropriations Committee explicitly directed the Academy to examine federal R&D priorities "within existing levels of funding." That study is now in progress, with retired NAS President Frank Press as chairman.

The graduate-education report was released at a public briefing last week by COSEPUP Chairman Phillip A. Griffiths, Director of the Institute for Advanced Study, at Princeton. Griffiths, who also presided over preparation of the 1993 COSEPUP report on federal financing of science, said it's a "myth" that "there is high unemployment among PhDs." Compared to the labor force as a whole and other professions, science and engineering PhDs are at very low levels of unemployment—1.6 percent in general, and 2 percent for new PhDs, up from 1.5 percent in the 1980s, he said.

Putting a bright gloss on the situation, Griffiths explained that "the high unemployment rates of PhDs upon graduation is due instead to delays in employment rather than true unemployment."

The report itself, however, presents a dimmer assessment, stating that "we find clear evidence of employment difficulties in many disciplines," and noting that

such "difficulties are hard to detect with traditional measures..." While pointing out, as Griffiths did, that the rates of unemployment are comparatively low, the report notes "a disquieting increase that bears watching." It also states, "When recent graduates find employment, they are increasingly underemployed or underutilized."

Addressing the question of whether the production rate of the PhD mill should be turned down, the COSEPUP report asserts that the accuracy record of supply-demand forecasts is too poor to serve as a guide for policy. Furthermore, the report argues, there's no practical way to reduce enrollments—ignoring the fact that the system largely runs on controllable amounts of federal research and fellowship funds.

Rather, noting the dispersion of science and engineering graduates into non-traditional jobs in recent years, the report calls for maintaining the research-based PhD format, but reinforcing its job potential with course work for employment outside of research. The report specifically rejects the creation of a "different doctorate" or a degree between the master's and the PhD, stating, without comment, that "employers report that they value the research experience required for the PhD."

There's also a call for shortening the time to the PhD, improved data collection about the job market, and more attention to counseling students about degree programs and employment prospects.

Like the 1993 report that called for more money when the problem at hand was how to get on with less money, the graduate-education report is off in its own dream world. The pressing economic problem of academe today is a crushingly expensive graduate-education system increasingly shunned by American students because it doesn't lead to jobs, and therefore increasingly dependent on enrollments from abroad.

Shrinkage—voluntarily or by a reduction in federal funding—would be therapeutic for the system as a whole. COSEPUP, however, is never unkind toward the institutional base from which its members are drawn. That less could be better in some circumstances is never an option.

"The committee suggests," the report states, "that the most appropriate response to flat or declining graduate enrollments of American students is to implement the measures advocated in this report, which should improve the functioning of the PhD labor market, and to continue efforts to strengthen the teaching of precollege and undergraduate science."

"These measures, we believe, would make graduate education in science and engineering more attractive, more effective, and accessible to a larger group of qualified American applicants."

In Print

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From the Human Frontier Science Program (HFSP):
Announcement of Awards for 1995 (30 pp., no charge), lists grants and fellowships from what can be likened to an international mini-NIH, running this year on about \$45 million, 80 percent from Japan, which proposed the program in the mid-1980s. The US share, about \$3.5 million a year, comes from NSF, NIH, DOE, and NASA. The awards roster this year shows 32 grants in "molecular approaches to biological function," 19 in brain research, and 160 two-year fellowships, at \$39,000 per year. Recipients are distributed among the major industrialized nations, but in total awards, the US is far in the lead.

Order from: Human Frontier Science Program, Tour Europe, 20 place des Halles, 67080 Strasbourg, France; tel. 33-88-21-51-21; fax 33-88-32-54-47.

From the US-Hungarian Science and Technology Joint Fund:

Activity Report: 1994 (120 pp., no charge), summarizes the many collaborative activities financed by this little-known partnership, under which the two governments have each provided about \$1 million a year since 1990 for projects, symposia, and other activities of mutual interest to their researchers, in academic and government institutions. The work supported includes basic research in the natural and physical sciences, engineering, environmental studies, etc. The US share, which comes through the State Department, appears in doubt for next year.

Order from: Embassy of Hungary, attn. Istvan Szemenyel, Science and Technology Counselor, 3910 Shoemaker St. NW, Washington, DC 20008; tel. 202/362-6730; fax 202/966-8135.

From the General Accounting Office (GAO):

School Facilities: America's Schools Not Designed or Equipped for 21st Century (GAO/HEHS-95-95; 67 pp., no charge), another glum report on equipment, space, and teaching skills in elementary and high schools. Even when up-to-date educational technology is available, the report says, schools often fail to make good use of it because of poor training of teachers, limited access to software and on-line services, and other limitations. Based on a stratified random sampling of 10,000 of the nation's 80,000 schools, the report presents state-by-state data on student-equipment ratios, laboratory and library facilities, class sizes, etc. A recent, related GAO report is also available: *School Facilities: Conditions of America's Schools* (GAO/HEHS-95-61; 65 pp.).

Order from: USGAO, PO Box 6015, Gaithersburg, Md. 20884-6015; tel. 202/512-6000; fax 301/258-4066.

From the Organization for Economic Cooperation and Development (OECD):

Education at a Glance (third edition, 374 pp., \$54), a slew of statistics about enrollments, expenditures, degrees

awarded, teacher salaries, curriculum, etc. in the 25-nation OECD, plus data on the non-member Czech Republic, Hungary, Poland, Russia. The new edition also presents results of public opinion surveys on education from 12 countries.

Available from OECD offices and bookshops in major cities around the world. In the US, order from: OECD Publications and Information Center, 2001 L St. NW, Suite 700, Washington, DC 20036-4910; tel. 202/785-6323; fax 202/785-0350.

From the National Academy of Sciences (NAS):

Understanding Marine Diversity (114 pp., \$29.95, plus \$4 for shipping), warns that animal and plant life in the oceans are poorly studied and under stress from human activities, and proposes a national research program embodying "a fundamental change" in research strategy. The nature of the proposed change is obscured by a dauntingly turgid text, which calls for, among other things, "a recognition that systems are structured into components that have characteristic spatial and temporal scales, and that only macroscopic descriptions of the dynamics within components may be relevant to the dynamics of the collections of components. But to determine the identity of those macroscopic descriptors requires a melding of bottom-up, individual-based approaches and top-down phenomenological approaches...." With support from DOE, the National Biological Service, the Office of Naval Research, NSF, and NOAA, the report was produced by the NAS Committee on Biological Diversity in Marine Systems, co-chaired by Cheryl Ann Butman, Associate Scientist, Woods Hole Oceanographic Institution, and James T. Carlton, Director, Marine Studies Program, Williams College.

Order from: National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 1-800/624-6242; in the Washington, DC, area: 202/334-3313.

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In Print

Official reports and other publications of special interest to the research community

(Copies of publications listed here are available from the indicated sources—not from SGR)

From the White House:

Bridge to a Sustainable Future: National Environmental Technology Strategy (86 pp., no charge), well intended in the worthy cause of environmental purity, this report, issued April 18 by Vice President Gore to mark the 25th anniversary of Earth Day, is larded with the empty-headed claptrap that comes of many hands and few minds, e.g., "Now the time has come for creative action and bold steps"; "Our focus must shift to systemic whole-facility, multi-media, and multi-sectoral approaches"; "Moving forward effectively will mean moving forward together." Among the useful, though far from novel, points buried in this outbreak of logorrhea: Environmental cleanup offers profit-making opportunities for industry; incentives for compliance are important, and strategies should shift toward prevention. The report was prepared "under the guidance of the National Science and Technology Council," a phantom, never-meeting body of government chiefs whose claimed existence provides some prestige and influence for the true source, the White House Office of Science and Technology Policy.

Order from: Interagency Environmental Technologies Office, 955 L'Enfant Plaza SW, Suite 5322, Washington, DC 20024; tel. 1-800/ENV-6676; internet: etstrategy@gnet.org

And a related report, from the National Commission for Employment Policy:

Environment and Jobs: The Employment Impact of Federal Environmental Investments (Report No. 9502; 33 pp., no charge), grouching about "a loose coalition of business leaders, local officials, and angry citizens who are fed up with excessive laws and regulations," the report provides brief case studies of four companies that found profits in cleaning up their industrial processes. A preface by Commission Chairman Anthony P. Carnevale urges continued government support for environmental technology, noting that the "electoral revolution of 1994" favors defense and threatens the Clinton Administration's civilian technology programs.

Order from: National Commission for Employment Policy, 1441 L St. NW, Suite 9000, Washington, DC 20005; tel. 202/724-1545; fax 202/724-0019.

From the National Science Foundation, no charge:

Non-Academic Scientists and Engineers [S&Es]: Trends from the 1980 and 1990 Censuses (NSF 95-306; 15 pp.), focusing on S&E jobs outside of academe, says they're increasing in number but slipping in pay. Population increases in virtually all fields of S&E employment are reported, with bachelor's or higher degree holders (predominantly in industry and government) rising over the decade

from 853,000 to 1.3 million, of whom 187,000 held PhDs. The overall number of S&E jobholders is even bigger, the report points out, since about "one third of those with science and engineering occupations on the 1980 and 1990 censuses appear to have less than a bachelor's degree." NSF found that real median earnings of the S&Es declined 1.3 percent. Among other subjects: trends in employment of women and immigrants and state counts of the S&Es. The report, derived from the decennial census, is brief and skimpy.

Technical Education in Two-Year Colleges (HES 17; 137 pp.), a major survey of an educational sector that figures large in the Clinton Administration's designs for upgrading work-force skills. Numbering about 1325 nationwide, two-year institutions enrolled some 325,000 students in engineering courses and 90,000 in "science technology" courses in 1992, the report states. Teaching staffs for engineering and science, full and part-time, stood at about 15,000. The report says the schools "seem to have in place considerable unused capacity" for cooperative programs with industry, worker retraining, etc. The authors are Lawrence Burton, a Senior Analyst at NSF, and Carin A. Celebuski, of Westat, Inc., the contractor for the study.

Order from: NSF, Division of Science Resources Studies, Arlington, Va. 22230; tel. 703/306-1774; fax 703/306-0510.

From the World Resources Institute (WRI):

Publications Catalog: 1995 (29 pp., no charge) lists dozens of reports, reference works, and directories published in recent years by WRI, a leading environmental policy-research center, thoroughly "green," but fairly calm. The publications range over a wide variety of environmental topics, including tax policy, protection of biodiversity, agricultural technology, corporate responsibility, etc.

Order from: World Resources Institute, 1709 New York Ave. NW, Washington, DC 20006; tel. 202/638-6300; fax 202/638-0036.

From the Industrial Research Institute (IRI):

Industrial R&D Organization and Funding Charts (129 pp., \$50 for IRI members; \$95 for others, plus \$10 for foreign orders), charts showing the place of R&D in the corporate structure of 120 firms and the sources of R&D funding within the firm. The companies are listed on a back page, but with a few exceptions, the charts are nameless. The survey, first of its kind, IRI says, found R&D centralized in 27 percent, decentralized in 10 percent, and "hybrid" in 63 percent. The findings conflict with the widespread impression of diffusion of R&D authority in industry, leading IRI Executive Director Charles Larson to comment in a foreword: "The high percentage of centralized organizations was somewhat surprising, as was the fact that most, i.e., 90 percent, of the 120 companies, had a corporate or central R&D function." IRI's 265 member companies perform around 80 percent of all industrial research in the US.

Order from: Industrial Research Institute, 1550 M St. NW, Suite 1100, Washington, DC 20005-1708; tel. 202/872-6350; fax 202/872-6356.

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